Построение графиков в полярных координатах

gris,labels

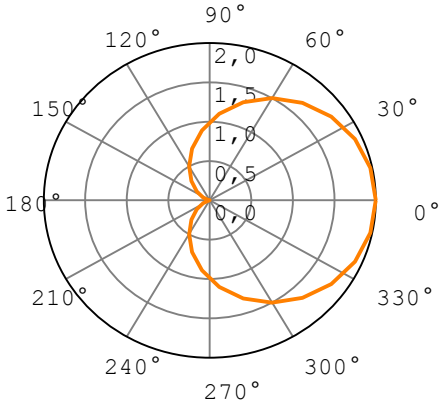
$$F_1 := \left| \begin{array}{l} [\,out\ N\,] := [\,0\ 30\,] \\ \Delta\varphi := \frac{2\cdot\pi}{N} \\ \text{for}\ \ k \in [\,1\,..\,(N+1)\,] \\ \quad \left| \begin{array}{l} \varphi := (k-1)\cdot\Delta\varphi \\ r := 1+\cos(\varphi) \\ out_{k,1} := r\cdot\cos(\varphi) \\ out_{k,2} := r\cdot\sin(\varphi) \end{array} \right. \\ out \end{array} \right.$$

$$F_2 := \left| \begin{array}{l} [\,out\ N\,] := [\,0\ 30\,] \\ \Delta\varphi := \frac{2\cdot\pi+2}{N} \\ \text{for}\ \ k \in [\,1\,..\,(N+1)\,] \\ \quad \left| \begin{array}{l} \varphi := -2\cdot\pi+(k-1)\cdot\Delta\varphi \\ r := 2-\varphi \\ out_{k,1} := r\cdot\cos(\varphi) \\ out_{k,2} := r\cdot\sin(\varphi) \end{array} \right. \\ out \end{array} \right.$$

$$F_3 := \left| \begin{array}{l} [\,out\ N\,] := [\,0\ 30\,] \\ \Delta\varphi := \frac{1\cdot\pi}{N} \\ \text{for}\ \ k \in [\,1\,..\,(N+1)\,] \\ \quad \left| \begin{array}{l} \varphi := \frac{3\cdot\pi}{4}+(k-1)\cdot\Delta\varphi \\ r := -\cos(\varphi)+\sin(\varphi) \\ out_{k,1} := r\cdot\cos(\varphi) \\ out_{k,2} := r\cdot\sin(\varphi) \end{array} \right. \\ out \end{array} \right.$$

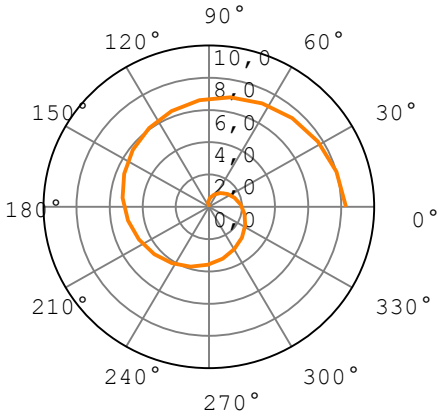
$$F_4 := \left| \begin{array}{l} [\,out\ N\,] := [\,0\ 30\,] \\ \Delta\varphi := \frac{1\cdot\pi}{N} \\ \text{for}\ \ k \in [\,1\,..\,(N+1)\,] \\ \quad \left| \begin{array}{l} \varphi := \frac{5\cdot\pi}{4}+(k-1)\cdot\Delta\varphi \\ r := -\cos(\varphi)-\sin(\varphi) \\ out_{k,1} := r\cdot\cos(\varphi) \\ out_{k,2} := r\cdot\sin(\varphi) \end{array} \right. \\ out \end{array} \right.$$

r = 1 + cos(φ)



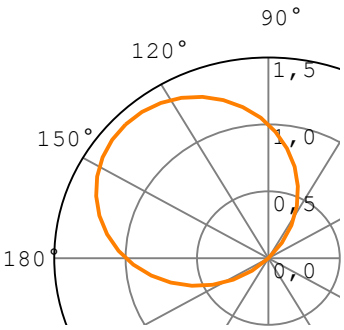

```
grid(2, 0.5)
labels(2, 0.5)
F1
```

r = 2 - φ



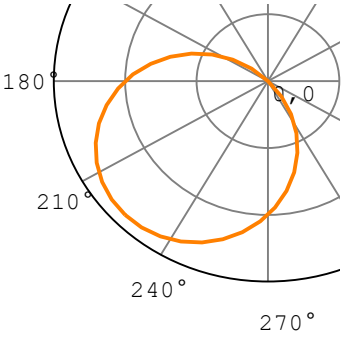

```
grid(10, 2)
labels(10, 2)
F2
```

r = - cos(φ) + sin(φ)




```
grid(1.5, 0.5)
labels(1.5, 0.5)
F3
```

r = - cos(φ) - sin(φ)

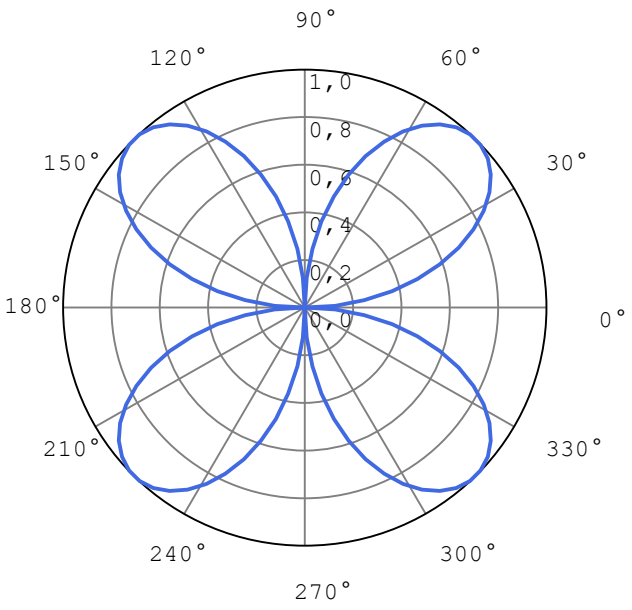



```
grid(1.5, 0.5)
labels(1.5, 05.)
F4
```

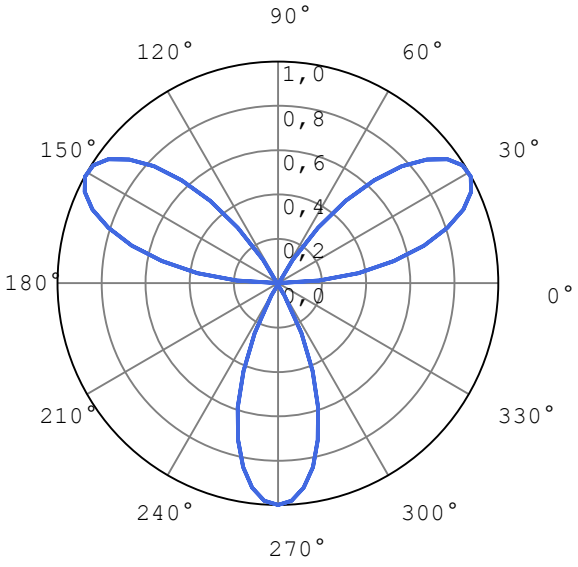
$$F_5 := \left| \begin{array}{l} [\, out \;\; N \,] := [\, 0 \;\; 100 \,] \\ \Delta\varphi := \dfrac{2 \cdot \pi}{N} \\ \text{for} \;\; k \in [\, 1 \,..\, (N+1) \,] \\ \quad \left| \begin{array}{l} \varphi := (k-1) \cdot \Delta\varphi \\ r := \left| \sin(2 \cdot \varphi) \right| \\ out_{k,1} := r \cdot \cos(\varphi) \\ out_{k,2} := r \cdot \sin(\varphi) \end{array} \right. \\ out \end{array} \right.$$

$$F_6 := \left| \begin{array}{l} [\, out \;\; N \,] := [\, 0 \;\; 100 \,] \\ \Delta\varphi := \dfrac{2 \cdot \pi}{N} \\ \text{for} \;\; k \in [\, 1 \,..\, (N+1) \,] \\ \quad \left| \begin{array}{l} \varphi := (k-1) \cdot \Delta\varphi \\ r := \sin(3 \cdot \varphi) \\ out_{k,1} := r \cdot \cos(\varphi) \\ out_{k,2} := r \cdot \sin(\varphi) \end{array} \right. \\ out \end{array} \right.$$

r = | sin(2·φ) |



r = sin(3·φ)



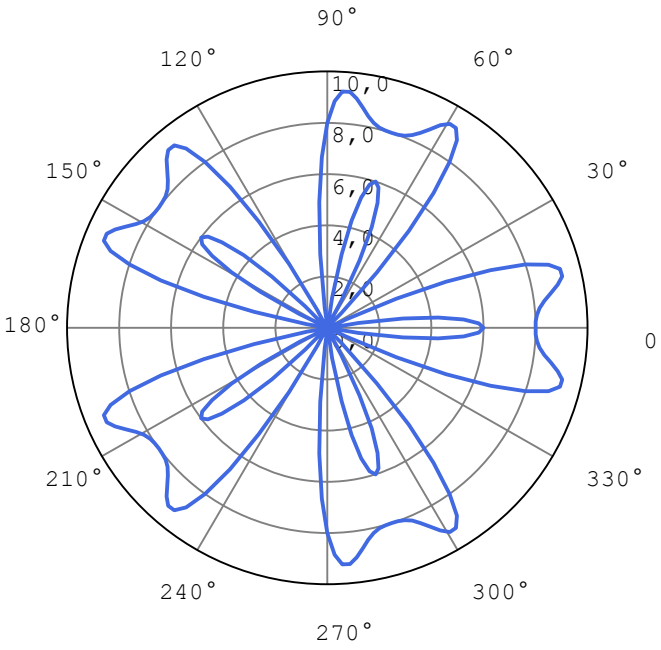

```
grid(1, 0.2)
labels(1, 0.2)
F5
```

```
grid(1, 0.2)
labels(1, 0.2)
F6
```

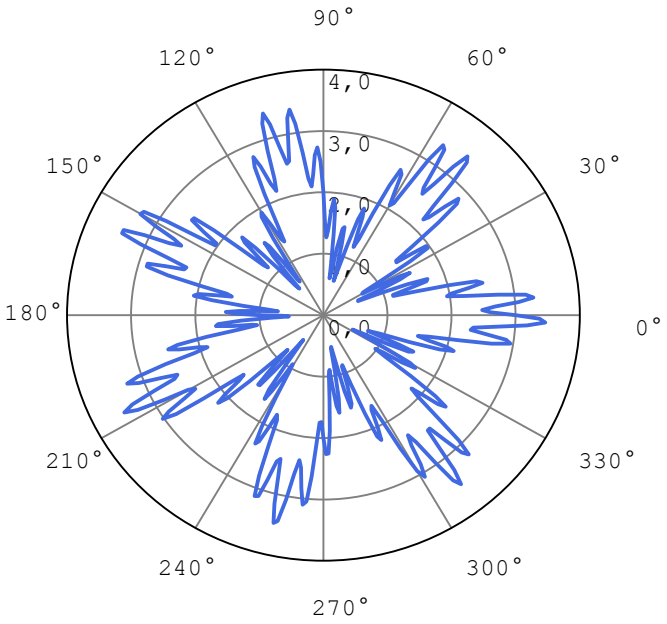
$$F_7 := \left| \begin{array}{l} [\,out\ N\,] := [\,0\ 200\,] \\ \Delta\varphi := \frac{2 \cdot \pi}{N} \\ \text{for}\ \ k \in [\,1\,..\,(N+1)\,] \\ \quad \left| \begin{array}{l} \varphi := (k-1) \cdot \Delta\varphi \\ r := 1 + 7 \cdot \cos(5 \cdot \varphi) \\ r := r + 4 \cdot (\sin(5 \cdot \varphi))^2 + 3 \cdot (\sin(5 \cdot \varphi))^4 \\ out_{k,1} := r \cdot \cos(\varphi) \\ out_{k,2} := r \cdot \sin(\varphi) \end{array} \right. \\ out \end{array} \right.$$

$$F_8 := \left| \begin{array}{l} [\,out\ N\,] := [\,0\ 360\,] \\ \Delta\varphi := \frac{2 \cdot \pi}{N} \\ \text{for}\ \ k \in [\,1\,..\,(N+1)\,] \\ \quad \left| \begin{array}{l} \varphi := (k-1) \cdot \Delta\varphi \\ r := 2 - 0.5 \cdot \sin(50 \cdot \varphi) \\ r := r + \cos(7 \cdot \varphi) \\ out_{k,1} := r \cdot \cos(\varphi) \\ out_{k,2} := r \cdot \sin(\varphi) \end{array} \right. \\ out \end{array} \right.$$

r = 1 + 7·cos(5·ϕ) + 4·sin²(5·ϕ) + 3·sin⁴(5·ϕ)



r = 2 − ½·sin(50·ϕ) + cos(7·ϕ)




```
grid(10, 2)
labels(10, 2)
F7
```

```
grid(4, 1)
labels(4, 1)
F8
```